REMARKS

Applicants respectfully request reconsideration of the present application in view of the reasons that follow. Claims 1-40, 43, 44, 51, 52, 59, and 60 were canceled previously. Claims 41, 42, 45-50, 53-58, and 61-75 are pending in the present application.

I. Rejection of Claims 41, 42, 45, 49, 50, 53, 57, 58, and 61-75 Under 35 U.S.C. § 103

In Section 4 of the Office Action, Claims 41, 42, 45, 49, 50, 53, 57, 58, and 61-75 were rejected under 35 U.S.C. § 103(a), as being unpatentable over U.S. Patent Publication No. 2006/0209982 to De Gaudenzi *et al.* (*De Gaudenzi*) in view of a paper titled "Signal Constellations for Non-Gaussian Communication problems," Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP), April 27-30 1993 by Dabak *et al.* (*Dabak*). Applicants respectfully disagree.

Claim 41 recites in part:

> selecting a signal constellation from a plurality of signal constellations based on the determined characteristic, the selected signal constellation including a plurality of constellation points, the plurality of constellation points selected by maximizing a minimum <u>Kullback-Leibler distance</u> between the plurality of constellation points;

(Underlining added). Though of different scope, Claims 49 and 57 recite a similar feature.

On page 3 of the Office Action, the Examiner states:

> De Gaudenzi does not disclose the method and device determines the distance between the constellation points as a function of a Kullback-Leiber distance. However, Dabak discloses a method of computing optimum signal sets (abstract). By optimizing the constellation points for non-Gaussian communication problems, the problems can be overcome and proper communication between users can be achieved. This optimization is achieved since the Kullback information can be used to express how performance varies with noise amplitude distribution and with signal set choice (III). Additional information regarding the Kullback information is provided in heading II.

Applicants agree that *De Gaudenzi* fails to provide any such teaching. Applicants, however, respectfully disagree that *Dabak* does provide any such teaching.

Dabak states:

> The Kullback information always defines a squared-distance-like quantity on the detection theoretic manifold of probability measures. As the number of observations, the dimension of $\underline{R}$, increases, this quantity determines the logarithmic performance rate (equation 3). Concluding from this result that asymptotically $P_{ij} = \exp\{-I(P_i|P_j)\}$ is, unfortunately, erroneous. The Kullback information does determine the so-called *logarithmic rate* at which the performance probability decreases with n. While this term does dominate the logarithmic rate, additive terms do exist that decay more slowly but confound attempts to evaluate numerically performance probabilities.

(Section 2. Detection Theoretic Geometry, pg. III-34). *Dabak* further states:

> Prediction of how much suboptimum designs impact performance (using Gaussian based designs in non-Gaussian situations, for example) can be made from calculations of the Kullback information, but only in the sense of determining how the logarithmic error probability rates differ.

(Section 4. Conclusions, pg. III-35). Thus, *Dabak* describes use of Kullback information to determine a logarithmic error probability rate. Nowhere, however, does *Dabak* teach, suggest, or describe a "plurality of constellation points selected by <u>maximizing a minimum Kullback-Leibler distance</u> between the plurality of constellation points" (underlining added) as recited in Claim 41, and similarly recited in Claims 49 and 57.

Therefore, *De Gaudenzi* and *Dabak*, alone and in combination, fail to teach, suggest, or describe all of the elements of at least Claims 41, 49, and 57. A rejection under 35 U.S.C. § 103(a) cannot be properly maintained where the references fail to teach each and every element of the claims. The remaining claims depend from one of Claims 41, 49, and 57. Therefore, Applicants respectfully request withdrawal of the rejection of Claims 41, 42, 45, 49, 50, 53, 57, 58, and 61-75.

II.   Rejection of Claims 46-48 and 54-56 Under 35 U.S.C. § 103

In section 5 of the Office Action, Claims 46-48 and 54-56 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *De Gaudenzi* in view of *Dabak* and further in view of U.S. Patent No. 7,269,436 to Won (*Won*). Applicants respectfully disagree.

Claims 46-48 depend from Claim 41. Claims 54-56 depend from Claim 49. As discussed in section I. above, *De Gaudenzi* and *Dabak* fail to teach all of the elements of at least Claims 41 and 49. *Won* also fails to teach, suggest, or describe a "plurality of constellation points selected by maximizing a minimum Kullback-Leibler distance between the plurality of constellation points" (underlining added) as recited in Claim 41, and similarly recited in Claim 49. Therefore, *De Gaudenzi*, *Dabak*, and *Won*, alone and in combination, fail to teach each and every element of at least Claims 41 and 49.

Additionally, Claim 46 recites:

> The method of claim 41, wherein selecting the signal constellation from the plurality of signal constellations is further based on a number of transmit antennas used in transmitting the modulated carrier wave.

(Underlining added). Though of different scope, Claim 54 recites a similar feature. On page 2 of the Office Action, the Examiner states:

> *Won* discloses transmitting information from the antennas. The signal constellation of the combination is selected based on the modulated transmitted signal. Therefore, the selecting of the signal constellation is based (dependent on) a number of transmit antennas used to transmit the signal.

Applicants respectfully disagree.

First, selecting the signal constellation based on the modulated transmitted signal in no way provides a teaching for a selection of the signal constellation based on a number of transmit antennas used to transmit the signal merely because the information is transmitted from the antennas. No selection is made based on the number of transmit antennas.

Second, *Won* states:

-9-

> A method and apparatus for allocating a power in a multiple-input multiple-output communication system is disclosed. A method of allocating power can include <u>estimating a channel condition</u> based on a reference signal received from a receiver, estimating power gains from the estimated channel condition, and <u>determining</u> respective power levels of transmission signals and <u>a number of available antenna elements for the transmission signals by using the power gains</u>.

(Abstract; underlining added). Therefore, *Won* has nothing whatsoever to do with selecting a constellation. To the contrary, *Won* determines a number of available antennas to allocate power in a MIMO system.

As a result, Applicants respectfully submit that *De Gaudenzi, Dabak,* and *Won* further fail to teach, suggest, or describe all of the elements of at least Claims 46 and 54. A rejection under 35 U.S.C. § 103(a) cannot be properly maintained where the references fail to teach each and every element of the claims. Therefore, Applicants respectfully request withdrawal of the rejection of Claims 46 and 54 under 35 U.S.C. § 103(a) for at least this additional reason. For at least the same reasons, Applicants respectfully request withdrawal of the rejection of Claims 47-48 and 55-56, which depend from Claims 46 and 54, respectively.

Applicants believe that the present application is in condition for allowance. Favorable reconsideration of the application is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extension of time is needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under
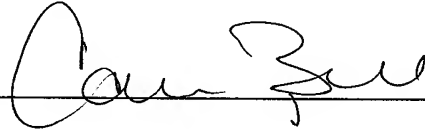
37 C.F.R. §1.136 and authorizes payment of any such extension fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date June 8, 2009   By _____

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